## Key-type Selector Switches A30NK

## 30-mm dia. Key-type Selector Switches

 Control panel miniaturization through a more compact design and modified wiring direction. Addition of Push-In Plus terminal blocks for easy wiring.

## Workability and safety improvements.

## Easy to Use

- You can connect up to three Contact Blocks in one stage for
 multistage expansion. (Screw terminal block type)
- Screw terminal structure is compatible with round crimp terminals. (Screw terminal block type)
- The terminals can be secured even when a contact block is mounted. (Screw terminal block type)
- Contact Blocks can be attached in any direction for easy assembly.

Safety

- Easy-to-operate lock lever for secure locking.
- Easy-mounting Contact Blocks provide finger protection.
- No loose connections of wiring means maintenance-free use. (Push-In Plus terminal block type)

Product Lineup

- The buttons and bezels come in a wide variety of colors and shapes.

Refer to Safety Precautions for All Pushbutton Switches/ Indicators and Safety Precautions on page 88.

## List of Models


$\qquad$ Shipped as a set that includes the Operation Unit, Mounting Collar, and Contact Block. For information on combinations, refer to Ordering Information on page 76.

## Model Numbers for Sets



## (1) Type

| Code | Type |
| :---: | :---: |
| $K$ | Key-type Selector Switch |

## (2) Number of Positions and Bezel Material

| Code | No. of <br> positions | Bezel material |
| :---: | :---: | :--- |
| $2 M$ | 2 | Brushed metal |
| $3 M$ | 3 | Brushed metal |

(3) Reset Method

| Code | Reset method |  |  |
| :---: | :--- | :--- | :--- |
| M | Manual | Two- <br> positions <br> manual |  |
|  | Three- <br> positions <br> manual |  |  |
| L | Automatic <br> reset on <br> left | Two- <br> positions <br> automatic | Three- <br> positions left <br> automatic |
| R | Automatic <br> reset on <br> right | Three- <br> positions <br> right <br> automatic |  |
| B | Automatic <br> reset on <br> left and <br> right | Three- <br> positions left <br> or right <br> automatic |  |

## Operation Angle


(7) Contacts and Terminals Specifications

| Code | Specification |
| :---: | :---: |
| $G$ | General/Screw Terminal Block |
| $P$ | General/Push-In Plus Terminal Block |

(8) Contact Configuration

| Code | Contact Blocks |  | Unit position |  |  | Two positions | Three positions |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | NO | NC | 1 | 2 | 3 |  |  |
| 100 | 1 | 0 | NO | --- | --- | Yes | --- |
| 002 | 0 | 1 | --- | --- | NC | Yes | --- |
| 101 | 2 | 0 | NO | --- | NO | Yes | Yes |
| 102 | 1 | 1 | NO | --- | NC | Yes | Yes |
| 201 | 1 | 1 | NC | --- | NO | --- | Yes |
| 202 | 0 | 2 | NC | --- | NC | Yes | Yes |
| 110 | 2 | 0 | NO | NO | --- | --- | Yes |
| 111 | 3 | 0 | NO | NO | NO | Yes | Yes |
| 112 | 2 | 1 | NO | NO | NC | Yes | Yes |
| 210 | 1 | 1 | NC | NO | --- | --- | Yes |
| 211 | 2 | 1 | NC | NO | NO | --- | Yes |
| 212 | 1 | 2 | NC | NO | NC | --- | Yes |
| 011 | 2 | 0 | --- | NO | NO | --- | Yes |
| 012 | 1 | 1 | --- | NO | NC | --- | Yes |
| 120 | 1 | 1 | NO | NC | --- | --- | Yes |
| 121 | 2 | 1 | NO | NC | NO | --- | Yes |
| 122 | 1 | 2 | NO | NC | NC | Yes | Yes |
| 220 | 0 | 2 | NC | NC | --- | --- | Yes |
| 221 | 1 | 2 | NC | NC | NO | --- | Yes |
| 222 | 0 | 3 | NC | NC | NC | Yes | Yes |
| 021 | 1 | 1 | --- | NC | NO | --- | Yes |
| 022 | 0 | 2 | --- | NC | NC | --- | Yes |

Note: 1. NO (blue): Normally open, NC (orange): Normally closed.
2. Refer to the following figure for Unit positions.


| CodeRelease <br> position |
| :--- |
| ATwo <br> positions <br> positions |
| B | LeftCharacteristics: Refer to page 79

$\square$ Subassemblies (Common): Refer to page 82.
■ Precautions for correct use: Refer to pages 88 to 99.

[^0]
## A30NK

## Ordering Information

Model Numbers for Sets .-. Shipped as a set that includes the Operation Unit, Mounting Collar, and Contact Block. Two-position, Key-type Selector Switches

| Appearance | Bezel material | No. of outputs | Model | (3) <br> Reset method | (5) Key release positions | (8)(8)(8) Contact configuration |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Brushed metal bezels | 2M |  | A30NK-2M(3)-01(5)A-G(8)(8)(8) | M:Manual <br> L:Automatic reset on left | A: All positions <br> B: Left <br> C: Right | 100 |
|  |  |  | A30NK-2M(3)-01(5)A-P(8)(8)(8) |  |  | 002 |
|  |  | 2 | A30NK-2M(3)-01(5)A-G(8)(8)(8) |  |  | 102 |
|  |  |  | A30NK-2M(3)-01(5)A-P(8)(8)(8) |  |  | 202 |
|  |  |  | A30NK-2M(3)-01(5)A-G(8)(8)(8) |  |  | $\begin{aligned} & 111 \\ & 222 \end{aligned}$ |
|  |  |  | A30NK-2M(3)-01(5)A-P(8)(8)(8) |  |  | $\begin{aligned} & 122 \\ & 112 \end{aligned}$ |

## Three-position, Key-type Selector Switches

| Appearance | Bezel material | No. of outputs | Model | (3) <br> Reset method | (5) Key release positions | (8)(8)(8) Contact configuration |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Brushed metal bezels | 3M | 2 | A30NK-3M(3)-01(5)A-G(8)(8)(8) | M: Manual <br> L: Automatic reset on left <br> R: Automatic reset on right <br> B: Automatic reset on left and right | A: All positions <br> B: Left <br> C: Right <br> D: Center <br> G: Left and right | $\begin{aligned} & 110 \\ & 011 \\ & 101 \\ & 220 \\ & 022 \\ & 202 \end{aligned}$ |
|  |  |  | A30NK-3M(3)-01(5)A-P(8)(8)(8) |  |  | $\begin{aligned} & 102 \\ & 210 \\ & 201 \\ & 012 \\ & 021 \end{aligned}$ |
|  |  | 3 | A30NK-3M(3)-01(5)A-G(8)(8)(8) <br> A30NK-3M(3)-01(5)A-P(8)(8)(8) |  |  | $\begin{aligned} & 111 \\ & 222 \\ & 122 \\ & 212 \\ & 221 \\ & 211 \\ & 121 \\ & 112 \end{aligned}$ |

Order Operation Units, Mounting Collars, and Contact Blocks individually. The same Mounting Collars and Contact Blocks are also used for the A22N Series.


Subassemblies - - - - Order Operation Units, Mounting Collars, and Contact Blocks individually. The same Mounting Collars and Contact Blocks are also used for the A22N Series.

## Operation Units

| No. of positions |  | Brushed metal | (5) <br> Key release positions |
| :---: | :---: | :---: | :---: |
|  | Bezel material and shape |  |  |
|  | Reset method | Model |  |
| 2 | Manual | A30NZ-2MM-01(5)A | A: All positions <br> B: Left <br> C: Right |
|  | Automatic reset on left | A30NZ-2ML-01(5)A |  |
|  | Manual | A30NZ-3MM-01(5)A |  |
|  | Automatic reset on left | A30NZ-3ML-01(5)A | B: Left |
|  | Automatic reset on right | A30NZ-3MR-01(5)A | D: Center |
|  | Automatic reset on left and right | A30NZ-3MB-01(5)A |  |

## Specifications

## Certified Safety Standard Ratings

UL 508 (File No. E76675), CSA C22.2 No. 14
6 A 240 VAC, 10 A 120 VAC
TÜV (EN60947-5-1)
AC-15 3 A 240 VAC
DC-13 4 A 24 VDC
CCC (GB14048.5)
AC-15 3 A 240 VAC
DC-13 4 A 24 VDC

## Application Standards

UL1059 and UL486E (Push-In Plus terminal block type)

## Ratings

Contacts (Standard Load)

| Rated insulation voltage |  | 600 V |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated carry current |  | 10 A |  |  |  |  |
| Rated voltage |  | 24 V | 120 V | 240 V | 380 V | 440 V |
| AC at $50 / 60 \mathrm{~Hz}$ | Resistive load (AC-12) | 10 A | 10 A | 6 A | 2A | 2 A |
|  | Inductive load (AC-15) | 10 A | 6 A | 3 A | 1.9 A | 1.6 A |
| DC | Resistive load (DC-12) | 8 A | 2.2 A | 1.1 A | --- | --- |
|  | Inductive load (DC-13) | 4 A | 1.1 A | 0.55 A | --- | --- |

Note: 1. The above ratings were obtained by conducting tests under the following conditions.
(1) Ambient temperature: $20 \pm 2^{\circ} \mathrm{C}$
(2) Ambient humidity: $65 \% \pm 5 \% \mathrm{RH}$
(3) Operating frequency: 30 operations/minute
2. Minimum applicable load: 10 mA at 5 VDC .

Specifications (When Operation Unit, Mounting Collar, and Contact Blocks Are Combined)

## Characteristics

| Item Type |  | Key-type Selector Switches |
| :---: | :---: | :---: |
| Allowable operating frequency | Mechanical | 30 operations/minute max. |
|  | Electrical | 30 operations/minute max. |
| Insulation resistance |  | $100 \mathrm{M} \Omega \mathrm{min}$. (at 500 VDC ) |
| Contact resistance |  | $100 \mathrm{~m} \Omega \mathrm{max}$. (initial value) |
| Dielectric strength | Between terminals of same polarity*1 | 2,500 VAC at $50 / 60 \mathrm{~Hz}$ for 1 min |
|  | Between each terminal and ground | 2,500 VAC at 50/60 Hz for 1 min |
| Vibration resistance | Malfunction | 10 to $55 \mathrm{~Hz}, 1.5-\mathrm{mm}$ double amplitude (malfunction within 1 ms ) |
| Shock resistance | Malfunction | $1,000 \mathrm{~m} / \mathrm{s}^{2} \mathrm{max}$. (malfunction within 1 ms ) |
| Durability | Mechanical | 500,000 operations min. (Switches with 3 positions: 300,000 operations min.) |
|  | Electrical | 500,000 operations min. (Switches with 3 positions: 300,000 operations min.) (250 VAC, 3 A, with an inductive load having power factor $\cos \theta=0.4$ ) |
| Ambient operating temperature*2 |  | -25 to $70^{\circ} \mathrm{C}$ |
| Ambient operating humidity |  | 35\% to 85\% RH |
| Ambient storage temperature*2 |  | -40 to $80^{\circ} \mathrm{C}$ |
| Degree of protection*3 |  | Conforming to IP66 |
| Electric shock protection class |  | Class II |
| PTI (tracking characteristic) |  | 175 |
| Degree of contamination (application environment) |  | 3 (EN 60947-5-1) |
| Weight |  | Approx. 75 g (for 1NC/1NO) |

*1. Push-In Plus terminal block type: 1,000 VAC at $50 / 60 \mathrm{~Hz}$ for 1 min.
*2. With no icing or condensation.
*3. Degree of protection from the front of the panel.
Operating Characteristics (for SPST-NO/SPST-NC)

| Item | Type | Key-type Selector Switches |
| :--- | :--- | :--- | :--- |
|  | Manual reset | Automatic reset |
| Total travel force (torque) (maximum TTF) | $0.6 \mathrm{~N} \cdot \mathrm{~m}$ | $0.6 \mathrm{~N} \cdot \mathrm{~m}$ |
| Total travel (TT) | 2 positions: Approx. $90^{\circ}, 3$ positions: Approx. $45^{\circ}$ |  |
| Resetting force (torque) (RF) | $0.5 \mathrm{~N} \cdot \mathrm{~m}$ max. | --- |

## Examples of Linked Contact Blocks (Screw terminal block type)



Note: If you increase the number of Contact Blocks, evaluate the Switch under actual working conditions before permanent installation and use the Switch within a number of switching operations that will not adversely affect the Switch's performance.

Key-type Selection Switches
Two-position Switches with Brushed Metal Bezels
A30NK-2M $\square$-01 $\square$ A-G $\square$
A30NK-2M $\square$-01 $\square$ A-P $\square$


Three-position Switches with Brushed Metal Bezels A30NK-3M $\square$-01 $\square$ A-G $\square$

A30NK-3M $\square$-01 $\square$ A-P $\square$


Depth with Linked Units
(Screw terminal block type)


Depth when a double-contact unit is mounted (Push-In Plus terminal block type)


## Terminal Arrangement

BOTTOM VIEW (Screw terminal block type)


BOTTOM VIEW
(Push-In Plus terminal block type)


## Terminal Connection Diagrams

| 2NO/1NC |
| :---: |
| Contact configuration code:112 |

Bottom View


Contact configuration code:112


## A22N／M22N／A30N

## Subassemblies（Common）

## Ordering Information

Subassemblies－－You can order Operation Units，LED Lamps，Mounting Collars，and Contact Blocks individually．Use them in combination for models that are not available as assembled Units．These can also be used as inventory for maintenance parts．

## LED Lamps

| Appearance | Rated voltage | Model |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 6 VAC／DC | 12 VAC／DC | 24 VAC／DC | 100／110／120 VAC | $\begin{gathered} \text { 200/220/230/240 } \\ \text { VAC } \end{gathered}$ |
|  | Red | A22NZ－L－RA | A22NZ－L－RB | A22NZ－L－RC | A22NZ－L－RD | A22NZ－L－RE |
|  | Green | A22NZ－L－GA | A22NZ－L－GB | A22NZ－L－GC | A22NZ－L－GD | A22NZ－L－GE |
|  | Yellow | A22NZ－L－YA | A22NZ－L－YB | A22NZ－L－YC | A22NZ－L－YD | A22NZ－L－YE |
|  | White | A22NZ－L－WA | A22NZ－L－WB | A22NZ－L－WC | A22NZ－L－WD | A22NZ－L－WE |
|  | Blue | A22NZ－L－AA | A22NZ－L－AB | A22NZ－L－AC | A22NZ－L－AD | A22NZ－L－AE |
|  | Orange | A22NZ－L－OA | A22NZ－L－OB | A22NZ－L－OC | A22NZ－L－OD | A22NZ－L－OE |

Mounting Collar


Contact Blocks


## Lighting Units

| Appearance | Terminals Specifications | Rated voltage | Model |
| :---: | :---: | :---: | :---: |
|  | Screw terminal block | $6 \mathrm{VAC} / \mathrm{DC}$ | A22NZ－T－A |
|  |  | 12 VAC／DC | A22NZ－T－B |
|  |  | 24 VAC／DC | A22NZ－T－C |
|  |  | 100／110／120 VAC | A22NZ－T－D |
|  |  | 200／220／230／240 VAC | A22NZ－T－E |
|  | Push－In Plus terminal block | 6 VAC／DC | A22NZ－T－AP |
| 0 |  | 12 VAC／DC | A22NZ－T－BP |
|  |  | $24 \mathrm{VAC} / \mathrm{DC}$ | A22NZ－T－CP |
|  |  | 100／110／120 VAC | A22NZ－T－DP |
|  |  | 200／220／230／240 VAC | A22NZ－T－EP |

## Dimensions

(Unit: mm)


Mounting Collar A22NZ-H-01


Lighting Units A22NZ-T- $\square$


Contact Blocks (Double Contact)
A22NZ-S-P2 $\square$


## A22N/M22N/A30N

## Accessories and Tools

## Ordering Information

## Accessories and Tools (Order Separately)

| Item | Appearance | Classification | Model | Remarks |
| :---: | :---: | :---: | :---: | :---: |
| Protective Cover |  | --- | A22NZ-A-303 | A protector designed to prevent incorrect operation. Cannot be used together with other accessories. (Rubber seal included.) <br> For exclusive use with panel cutouts of 22.3 and 25.5 mm dia. Key-type selector switches cannot be used. |
| Plastic Hole Plug * |  | Round | A22NZ-A-401 | Can be plugged into precut panel holes for future expansion. <br> Applicable panel thickness: 0.8 to 3.0 mm |
| Metal Hole Plug * |  | Round | A22NZ-A-402 | Can be plugged into precut panel holes for future expansion. <br> Applicable panel thickness: 0.8 to 6.0 mm (Rubber seal included.) |
| Lock Ring * |  | Round | A22NZ-A-403 | Used when a more secure lock is required to prevent rotation inside the Operation Unit. (Rubber seal included.) |
| Lock Ring |  | --- | A22NZ-A-50501 | Used when a more secure lock is required to prevent rotation of the Operation Unit. |

## Accessories and Tools

## Ordering Information

| Item | Appearance | Classification | Model | Remarks |
| :---: | :---: | :---: | :---: | :---: |
| Small Legend Plate Frame * |  | Black | A22NZ-A-50103 | Legend Plate with no text on black background included. |
| Small Legend Plates (Standard Size) * |  | Without text | A22Z-3443B | Black |
|  |  |  | A22Z-3443R | Red |
|  |  |  | A22Z-3443W | White |
|  |  |  | A22Z-3443C | Transparent |
|  |  | $\bigcirc$ | A22Z-3443R-2 | White text on red background |
|  |  | STOP | A22Z-3443R-4 |  |
|  | $\square$ | I | A22Z-3443B-1 | White text on black background |
|  |  | START | A22Z-3443B-3 |  |
|  |  | ON | A22Z-3443B-5 |  |
|  |  | OFF | A22Z-3443B-6 |  |
|  |  | UP | A22Z-3443B-7 |  |
|  |  | DOWN | A22Z-3443B-8 |  |
|  |  | POWER ON | A22Z-3443B-9 |  |
|  |  | OFF-ON | A22Z-3443B-10 |  |
| Large Legend Plate Frame * |  | Black | A22NZ-A-51103 | Legend Plate with no text on black background included. |
| Large Legend Plates * |  | Without text | A22Z-3453B | Black |
|  |  |  | A22Z-3453R | Red |
|  |  |  | A22Z-3453W | White |
|  |  |  | A22Z-3453C | Transparent |
| Tightening Wrench |  | --- | A22NZ-A-301 | Used to tighten Mounting Nuts from the back of the panel. |
| LED Lamp Extractor |  | --- | A22NZ-A-302 | Made of rubber and used to easily remove and attach LED Lamps. |
| Cap Tightening Wrench |  | --- | A22Z-3908 | Used to replace the Caps on Flat, Projected, and Fullguard Pushbutton Switches. |

* For 22.3-mm panel hole diameter.



## Accessories and Tools

## Dimensions

## Legend Plate Frames

General A22NZ-A-50103


Large A22NZ-A-51103


Large A22Z-3453 $\square$


LED Lamp Extractor
A22NZ-A-302


Cap Tightening Wrench
A22Z-3908


# Refer to Safety Precautions for All Pushbutton Switches／Indicators． 

## Signal Word Definitions

| Precautions <br> for Safe Use | Supplementary comments on what to do or <br> avoid doing，to use the product safely． |
| :---: | :--- |
| Precautions <br> for Correct <br> Use | Supplementary comments on what to do or <br> avoid doing，to prevent failure to operate， <br> malfunction，or undesirable effects on <br> product performance． |

## Precautions for Safe Use

## For both the Screw terminal block type and the Push－In Plus terminal block type

－Do not perform wiring with power supplied to the Switch／Indicator． Do not touch the terminals or other charged parts while power is being supplied．Doing so may result in electric shock．
－Do not disassemble or modify the Switch／Indicator under any circumstances．
－Doing so may prevent the Switch／Indicator from functioning to its full capability．Do not drop the Switch／Indicator．Do not apply pressure that may deform or alter the Switch／Indicator．
－The durability of the Switch varies considerably depending on the switching conditions．Always test the Switch／Indicator under actual working conditions before application and use the Switch／Indicator only for the number of switching operations allowed．
－Do not allow the load voltage and current to exceed the rated value．This may damage or burn out the Switch／Indicator．
－Do not use the Switch／Indicator in locations where explosive or flammable gases or liquid may be present or scattered．The electric ark or the heat caused by switching contacts may cause a fire or explosion．
－Do not use the Switch／Indicator in locations where toxic gases， such as $\mathrm{H}_{2} \mathrm{~S}, \mathrm{SO}_{2}, \mathrm{NH}_{3}, \mathrm{HNO}_{3}$ ，and $\mathrm{Cl}_{2}$ ，may be present，or in locations subject to high temperature or humidity．Doing so may damage the Switch／Indicator due to contact failure or corrosion．
－Do not use the Switch／Indicator submersed in oil or water，or in locations continuously subject to splashes of oil or water．Doing so may result in oil or water entering and damaging the Switch／ Indicator．
－Do not use or keep the Switch／Indicator under the following conditions：
－Subject to severe temperature changes．
－Subject to high humidity or condensation．
－Subject to severe vibration or shock．
－Where direct rays of the sun strike．
－Where sea breeze may be present．
－Make sure that a rubber washer is present between the Operation Unit and the panel．Otherwise，the specifications of the protective structure may not be satisfied．
－Do not apply excessive force to the Switch or wiring． A damaged or deformed contact block may cause contact failure．
－Use an appropriate wire and ferrule．
－Exercise caution to avoid wiring errors when connecting the
terminals．
－To prevent wire from smoking or igniting，use the wire indicated in the following table．

| Model | Wire <br> Type | Wire | Recommended <br> Wires | Stripped length |
| :--- | :--- | :--- | :--- | :--- |
| A22N，M22N <br> （Screw terminal <br> block） | Solid <br> wire／ <br> stranded <br> wire | Copper |  | 1.25 to $2.5 \mathrm{~mm}^{2}$ <br> $/$ AWG 16 to 14 <br> Solid wire： <br> 1.6 mm max． |
| A22N－P，M22N－P | 8 mm |  |  |  |
| （Push－In Plus <br> terminal block） |  | 0.25 to $1.5 \mathrm{~mm}^{2} /$ <br> AWG 24 to 16 | Ferrules used <br> $: 10 \mathrm{~mm}$ <br> Ferrules not <br> used ： 8 mm |  |

Use wiring crimp terminals and ferrule terminals of the specified size．
－For Push－In Plus terminal blocks，use only one wire per terminal． For screw terminal blocks，use no more than two wires of the same size and type with no more than two crimp terminals per terminal．
－After storing the product for a long time exceeding 1 year，perform， at a minimum，inspections of the operating characteristics，contact resistance，insulation resistance，and dielectric strength as well as evaluate the product under the working conditions．
－This Switch／Indicator is intended for indoor use only． Using the Switch／Indicator outdoors may result in failure．

## Push－In Plus Terminal Blocks

－Do not wire anything to the release holes．
－Do not tilt or twist a flat－blade screwdriver while it is inserted into a release hole on the terminal block．The terminal block may be damaged．
－Insert a flat－blade screwdriver into the release holes at an angle． The terminal block may be damaged if you insert the screwdriver straight in．
－Do not allow the flat－blade screwdriver to fall out while it is inserted into a release hole．
－Do not bend a wire past its natural bending radius or pull on it with excessive force．
Doing so may cause the wire disconnection．
－Do not insert more than one wire into each terminal insertion hole．
－Do not mount A22N－P Push－In Plus terminal contact blocks on A22N screw terminal blocks．Doing so may result in unsatisfactory performance．

## Precautions for Correct Use

## Mounting

- Do not tighten the Mounting Nut more than necessary using tools such as pointed-nose pliers. Doing so will damage the Mounting Nut. (The tightening torque of the Mounting Nut is 1.0 to $2.0 \mathrm{~N} \cdot \mathrm{~m}$.)


## Wiring (Screw terminal block)

- Terminal screws must be M3.5 Phillips or slotted screws with a square washer.
- The terminal screw tightening torque is 1.0 to $1.3 \mathrm{~N} \cdot \mathrm{~m}$.
- Solid wires, stranded wires, and crimp terminals can be connected to the Switch/Indicator.
Bare Crimp Terminals


Crimp Terminals with Insulating Sheathes


## Wiring (Push-in Plus terminal block)

1. Connecting Wires to the Push-In Plus Terminal Block

## Part Names of the Terminal Block

<A22N>

<M22N>


## Connecting Wires with Ferrules and Solid Wires

- Insert the solid wire or ferrule straight into the terminal block until the end strikes the terminal block. The angle should be approximately $6^{\circ}$.
- If a wire is difficult to connect because it is too thin, use a flat-blade screwdriver in the same way as when connecting stranded wires.


## <A22N>



The wiring for the Lighting Unit and Contact Block (2 contacts) are the same as for the Contact Block (1 contact) shown in the above illustration.
<M22N>



## Connecting Stranded Wires

Use the following procedure to connect the wires to the terminal block.

1. Hold a flat-blade screwdriver at an angle and insert it into the release hole.
The angle should be approximately $6^{\circ}$. If the flat-blade screwdriver is inserted correctly, you will feel the spring in the release hole.
2. With the flat-blade screwdriver still inserted into the release hole, insert the wire into the terminal hole until the end strikes the terminal block.
3. Remove the flat-blade screwdriver from the release hole.

## <A22N>



The wiring and screwdriver angles for the Lighting Unit and Contact Block (2 contacts) are the same as for the Contact Block (1 contact) shown in the above illustration.

## <M22N>



## Checking Connections

- After the insertion, pull gently on the wire to make sure that it will not come off and it is securely fastened to the terminal block.
- To prevent short circuits, insert the stripped part of a stranded or solid wire, or the conductor part of a ferrule until it is hidden inside the terminal insertion hole. (See the following diagram.)


0


3．Recommended Ferrules and Crimp Tools Recommended ferrules

| Applicable <br> wire |  | Ferrule <br> Conductor <br> Length | Recommended ferrules |  |  |
| :--- | ---: | :---: | :--- | :--- | :--- |
| $\left(\right.$ mm $\left.^{2}\right)$ | （AWG） |  | Phoenix Contact <br> product | Weidmuller <br> product | Wago product |
| 0.25 | 24 | 8 | Al0．25－8 | $\mathrm{H} 0.25 / 12$ | FE－0．25－8N－YE |
| 0.34 | 22 | 8 | Al0．34－8 | $\mathrm{H} 0.34 / 12$ | FE－0．34－8N－TQ |
| 0.5 | 20 | 8 | Al0．5－8 | $\mathrm{H} 0.5 / 14$ | FE－0．5－8N－WH |
| 0.75 | 18 | 8 | Al0．75－8 | $\mathrm{H} 0.75 / 14$ | FE－0．75－8N－GY |
| 1 | 18 | 8 | Al1－8 | $\mathrm{H} 1.0 / 14$ | FE－1．0－8N－RD |
| 1.5 | 16 | 8 | Al1．5－8 | $\mathrm{H} 1.5 / 14$ | FE－1．5－8N－BK |

Note：1．Make sure that the outer diameter of the wire coating is smaller than the inner diameter of the insulation sleeve of the recommended ferrule．
2．Make sure that the ferrule processing dimensions conform to the following figures．


## Recommended Flat－Blade Screwdrivers

Use a flat－blade screwdriver to connect and remove wires．
Use one of the following flat－blade screwdrivers．
The following table shows manufacturers and models as of 2015／Dec．


| Model | Manufacturer |
| :--- | :--- |
| ESD0．40 $\times 2.5$ | Wera |
| SZS $0.4 \times 2.5$ | Phoenix Contact |
| SZF $0-0.4 \times 2.5^{*}$ | Wiha |
| $0.4 \times 2.5 \times 75302$ | Facom |
| AEF．2．5 $\times 75$ | Wago |
| $210-719$ | Weidmuller |
| SDI $0.4 \times 2.5 \times 75$ |  |

＊OMRON＇s exclusive purchase model XW4Z－00B is available to order as SZF 0－0．4 x 2.5 （manufactured by Phoenix Contact）．
－After wiring the Switch／Indicator，provide a sufficient insulation distance．

The following information applies to both screw terminal blocks and Push－In Plus terminal blocks．

## LED Lamps

－A current－limiting resistor is built in the LED lamp，so the installation of an external resistance is not required．
－Lighting malfunction of the LED lamp
A micro－current of approximately 0.1 mA or less is sufficient to turn on the LED lamps．Take a countermeasure like adding a resistor to prevent mis－lighting in parallel to the LED lamp． The micro－current varies with the machine（leak current or stray capacity between cables，etc．）．Select resistance value and allowable power consumption that meet the actual current．
（Example of lighting malfunction prevention circuit） When using a 24 －VAC／VDC lighted unit


## Key－Type Selector Switches

－Make sure to insert the key to the bottom of the cylinder before turning it．

## Application

## Mounting to the Panel

## Panel Hole Dimensions

## ＜A22N＞

－Panel hole dimensions are given below．
－The recommended panel thicknesses are given below．

| Panel hole dimension | Panel thickness |
| :---: | :---: |
| 22.3 dia． | 0.8 to 5 mm |
| 25.5 dia． | 0.8 to 6 mm |

－If outer surface treatment such as coating is performed for the panel，the panel dimensions after outer surface treatment must meet the specified panel dimensions．
－The following figure gives pitch dimension A and pitch dimension $B$ between the centers of the mounting holes．

Panel Hole Dimensions for 22．3 Diameter


Dimension A


Panel Hole Dimensions for 25．5 Diameter


## Dimension A

| Wire type | Number of <br> linked <br> Contact Blocks | Number of <br> wires per <br> terminal | Minimum <br> allowable pitch <br> Dimension A <br> （mm）or larger |
| :--- | :---: | :---: | :---: |
| Leads（stranded <br> wire／solid wire） | 1 | 1 | 50 |
| Bare crimp terminals | 1 | 1 | 50 |
| Crimp terminals <br> with insulating sheathes | 1 | 1 | 60 |

Note：The minimum mounting pitch is based on three Contact Blocks in stage 1 with one wire attached to each terminal．
If the Mounting Collar lock levers all face the same direction at the minimum mounting pitch，be sure to note the order the mounting collars are attached to the Operation Unit．
If you attach two wires or link Units，determine the mounting pitch based on the dimensions diagrams and ease of operation and wiring．

## Dimension A When Using Accessory

－Dimension A is 50 mm minimum when a Standard Legend Plate Frame is attached．
－Dimension A is 51 mm minimum when a Large Legend Plate Frame is attached．
－Dimension A is 75 mm minimum when a Protective Cover is attached．

## Dimension B

| Operation Unit shape | Dimension B |
| :---: | :---: |
| Mushroom | 40 mm min． |
| Other than the above | 30 mm min． |

＜M22N＞
－Panel hole dimensions are given below．
－Acceptable panel thickness is between 0.8 and 6 mm ．
－If outer surface treatment such as coating is performed for the panel，the panel dimensions after outer surface treatment must meet the specified panel dimensions．

Panel Hole Dimensions for 22．3 Diameter


Panel Hole Dimensions for 25．5 Diameter

＜A30N＞
－Panel hole dimensions are given below．
－Acceptable panel thickness is between 0.8 and 7 mm ．
－If outer surface treatment such as coating is performed for the panel，the panel dimensions after outer surface treatment must meet the specified panel dimensions．
－The following figure gives pitch dimension $A$ and pitch dimension $B$ between the centers of the mounting holes．

## Panel Hole Dimensions



Dimension A


## Dimension A

| Wire type | Number of <br> linked <br> Contact Blocks | Number of <br> wires per <br> terminal | Minimum <br> allowable pitch <br> Dimension A <br> (mm) or larger |
| :--- | :---: | :---: | :---: |
| Leads <br> (stranded wire / <br> solid wire) | 1 | 1 | 50 |
| Bare crimp terminals | 1 | 1 | 50 |
| Crimp terminals <br> with insulating <br> sheathes | 1 | 1 | 60 |

Note: The minimum mounting pitch is based on three Contact Blocks in stage 1 with one wire attached to each terminal.
If the Mounting Collar lock levers all face the same direction at the minimum mounting pitch, be sure to note the order the mounting collars are attached to the Operation Unit.
If you attach two wires or link Units, determine the mounting pitch based on the dimensions diagrams and ease of operation and wiring.

## Dimension B

| Operation Unit shape | Dimension B |
| :---: | :---: |
| Mushroom | 40 mm min. |
| Other than the above | 30 mm min. |

## Mounting the Operation Unit

<A22N>

- Panel Hole of 22.3-mm Diameter

Insert the Operation Unit from the front of the panel, insert the Lock Ring and Mounting Nut from the back of the panel, and tighten the Mounting Nut. Before tightening, check that the rubber washer is present between the Operation Unit and the panel.


- Panel Hole of 25.5-mm Diameter

Do not use the Lock Ring, and tighten the Mounting Nut while confirming that the projecting part (see following figure) on the Mounting Nut is aligned with mounting hole. Before tightening, check that the rubber washer is present between the Operation Unit and the panel.


- Align the Lock Ring with the slot on the case and insert it so that the edge is flush with the panel.
<A30N>
- Insert the Operation Unit from the front of the panel, insert the Lock Ring and Mounting Nut from the back of the panel, and tighten the Mounting Nut. Before tightening, check that the rubber washer is present between the Operation Unit and the panel.



## Attaching the Switch Unit to the Indicator Unit <M22N>

- Panel Hole of 22.3-mm Diameter

Insert the Indicator Unit from the front of the panel, insert the Mounting Nut from the back of the panel, and tighten the Mounting Nut. Before tightening, check that the rubber washer is present between the Indicator Unit and the panel.


- Panel Hole of $25.5-\mathrm{mm}$ Diameter

Tighten the Mounting Nut while confirming that the projecting part (see following figure) on the Mounting Nut is aligned with mounting hole. Before tightening, verify that the rubber washer is present between the Operation Unit and the panel.



## Mounting the Lock Ring

## <A22N/A30N>

- Align the grooves on the Operation Unit with the protruding parts of the Lock Ring and mount.

- When experiencing difficulties when mounting a Lock Ring, use the following procedure.

1. Insert the Lock Ring into groove A on the Operation Unit.

2. When the Lock Ring is in the position shown in the figure below, rotate it to insert the protruding part of the Lock Ring into groove B on the Operation Unit.

3. When the Lock Ring is in the position shown in the figure below, move it in the direction indicated by the arrow.


## Attaching the Switch Unit to the Indicator Unit

 <M22N>- Align the "TOP" marks on the Indicator Unit and Switch Unit and insert the Indicator Unit into the Switch Unit. Insert it all the way until it clicks into place.


Removing the Switch Unit
<M22N>

- Insert a screwdriver into the tab on the Switch Unit. Move the screwdriver in direction (2) to remove the Switch Unit.



## Contact Block and Lighting Unit Attaching the Contact Block and Lighting Unit

- Catch the projection on the opposite side of the Mounting Collar from the lever side and press the Contact Block in the direction indicated at (1).


When attached

## Removing the Contact Block

- Insert a screwdriver into the gap between the Mounting Collar and Contact Block and press it inward in the direction shown at (2).



## Attaching the Reinforcement Plate (Screw terminal block type)

- To link Contact Blocks together, attach a Reinforcement Plate in the direction shown in the following figure. To remove the Plate, insert a screwdriver in the direction indicated at (1) and rotate it in the direction indicated at (2).




## Engraving

## (Except for Non-Lighted / Opaque Types)

- Engrave legends on the Legend Plates.

Do so with the straight part of the Legend Plate positioned on the right and left.

- The characters must be engraved no deeper than 0.5 mm . Use an alcohol-based paint, such as a melamine, phthalic acid, or acrylic resin based paint
<A22N>

| Projected, Full-guard, or Mushroom <br> Switches | Flat Switches |
| :--- | :--- |
|  |  |

<M22N>

## Attaching Character Films

## (Except for Non-Lighted / Opaque Types)

 <A22N>- To attach a character film, remove the Button and attach the film, aligning it with the straight portions of the Legend Plate.


## Projected Switches

Full-guard Switches



Mushroom Switches


Flat Switches

- Prepare films of the following sizes depending on the type of Legend Plate.

| Projected, Full-guard, or Mushroom Switches | Legend Plate dimensions |  |
| :---: | :---: | :---: |
|  | Film dimensions |  |
| Flat Switches | Legend Plate dimensions |  |
|  | Film dimensions | $\mathrm{T}=0.1 \text { to } 0.2 \mathrm{~mm}$ |

## <M22N>

- To attach a character film, remove the Button and attach the film, aligning it with the straight portions of the Legend Plate.


> Semi-spherical Switches


- Film processing dimensions should be as per the indications below.
Legend Plate
dimensions
Film
dimensions


## Removing and Tightening the Cap

For all Switches except for Mushroom Switches, use the A22Z-3908 Cap Tightening Tool to loosen the cap. When you tighten the cap, make sure that the Legend Plate is in the correct position and then turn the cap in the direction opposite of the direction shown in the following figure. Tighten it to a torque of 0.5 to $1.0 \mathrm{~N} \cdot \mathrm{~m}$ so that it will not become loose.
(1)


(1)

(2)


Attaching the LED Lamp from the Panel Surface

- Insert the LED Lamp into the LED Lamp Extractor as shown in the following figure. Align the projections on the LED Lamp with the LED Lamp insertion guides, insert the LED Lamp, and turn it in the direction indicted at (2).


## <A22N>


<M22N>


## Control Box

You can attach a Legend Plate Frame. Attach it in the direction shown in the following figure.

## Attaching the LED Lamp to the Lighting Unit

- Insert the protrusions on the LED Lamp into the guides on the Lighting Unit and then turn the LED Lamp in direction (2) to lock it in place.



## Attaching and Replacing LED Lamps Removing the LED Lamp from the Panel Surface

- Insert the LED Lamp Extractor as shown in the following figure and then rotate the Extractor in the direction shown at (2) while pressing it inward.
<A22N>

<M22N>

 Mount the Switch in the same way as for a standard panel. The tightening torque of the Box screws is 1.4 to $2.0 \mathrm{~N} \cdot \mathrm{~m}$.



## Creating a Cable Hole

To open a cable hole, leave the cover attached, place the tip of a screwdriver in the grooves at four locations around the cable hole, and strike the screwdriver with a hammer to open the hole.


## Securing the Connector Cable

1. Insert the connector into the cable port hole in the Box and secure with the fixing nut inside the box.
2. Open a hole in the thin rubber section of the rubber ring
3. Pass the tightening cap through the cable, insert the cable into the connector, and tighten the hexagonal nut to secure the cable.

| Cable diameter (mm) | Connector |
| :---: | :---: |
| 7 to 9 dia. | A22Z-3500-1 |
| 9 to 11 dia. | A22Z-3500-2 |



## Attaching and Removing Legend Plates

- Press the Legend Plate into the depression in the Legend Plate Frame. The Legend Plate Frame can be separate or it can be mounted on the panel when you attach the Legend Plate.
- The direction of the characters will depend on the mounting direction of the Operation Unit if the Switch is a Selector Switch or Key Selector Switch.

- You can easily remove the Legend Plate by pressing it forwards from the back of the Legend Plate Frame.
- The acrylic plastic Legend Plate is easily damaged by shock. Handle it with care.



## Attaching the Lock Ring

Attach the Lock Ring as shown in the following figure.
To ensure water resistance, attach the rubber washer in the specified location.


- Align the TOP mark on the Operation Unit, part A on the Legend Plate, and the notch in the panel, and insert the Operation Unit.

- If there is no notch in the panel, remove part A from the Legend Plate with pliers.



## Attaching the Protective Cover

Attach the Protective Cover (A22NZ-A-303) to a panel that is 0.8 to 1.0 mm thick. To ensure water resistance, attach the rubber washer in the specified location.


## Attaching the Sealing Cap

<A22N/M22N>

- Panel acceptable thickness is given below.

| Panel hole dimension | Panel thickness |
| :---: | :---: |
| 22.3 dia. | 0.8 to 4.2 mm |
| 25.5 dia. | 0.8 to 5.2 mm |

Panel Hole of 22.3-mm Diameter
Attach the Sealing cap as shown in the following figure. To ensure water resistance, attach the rubber washer in the specified location.


## Panel Hole of 25.5-mm Diameter

Attach the Sealing cap as shown in the following figure. Do not use the Lock Ring, and tighten the Mounting Nut while confirming that the projecting part on the Mounting Nut is aligned with mounting hole. To ensure water resistance, attach the rubber washer in the specified location.


## Mounting the 30-dia. Resin Attachments

## <A22N>

- Acceptable panel thickness is between 1.8 and 2.2 mm .
- Mount the attachment as shown in the following figure.
- To ensure water resistance, attach the rubber washer in the specified location.

<M22N>
- Acceptable panel thickness is between 1.8 and 2.2 mm .
- Mount the attachment as shown in the following figure.
- Purchase and mount a separate lock ring (A22NZ-A-50501).
- To ensure water resistance, attach the rubber washer in the specified location.



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[^0]:    Specifications: Refer to page 60.
    Dimensions: Refer to page 80.

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